

**REMARKS/ARGUMENTS**

Reconsideration and withdrawal of the rejections of the application and consideration and entry of this paper are respectfully requested in view of the herein remarks, which place the application in condition for allowance.

**I. STATUS OF THE CLAIMS AND FORMAL MATTERS**

Claims 1-99 are currently pending and are rejected in the Office Action mailed on April 14, 2010. Claims 2, 8-10, 32-34, 52, 77, and 83-85 were previously cancelled. Claims 1, 25, 51, 72, 75, and 76 are hereby amended. Claims 3, 26, 53, and 78 are withdrawn and claim 99 is cancelled. No new matter has been introduced. Support for this amendment is provided throughout the Specification as originally filed for example at page 10, line 33 - page 11, line 27; and page 12, lines 29-31.

**II. CLAIM OBJECTIONS**

Page 5 of the Office Action objects to claim 76 for a typographical error. As indicated in the listing of the claims above, claim 76 is hereby amended, making moot the objection to claim 76.

Claim 99 is objected to as being a duplicate of claim 98. As indicated in the listing of claims, claim 99 is hereby cancelled, making moot the objection to claim 99.

Claim 26 is objected to for failing to further limit the subject matter of the previous claim. As indicated in the listing of the claims, claim 26 has been withdrawn.

Applicant respectfully requests reconsideration and withdrawal of the claim objections in this Application.

### **III. REJECTIONS UNDER 35 U.S.C. § 112**

Claims 3, 53, 71, 75, and 78 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 3, 53 and 78 are presently withdrawn, making moot the rejections.

Claim 71 is rejected as allegedly being indefinite for failing to provide structural limitations in reciting, “the toothed belt is configured to replace a chain in a timing control system without any dimensional variations being made to the timing control system.” Applicant respectfully submits that the claimed inserts allows the replacement of chains and gears used in an oil-wet environment by belts without changing other components of the system, as recited in the present specification at least at page 15, lines 3-7, and therefore provides sufficient structural limitations to the claimed belt.

Claim 75, as indicated in the above listing of claims, is presently amended, making moot the rejection.

Applicant respectfully submits the claims in the present application are not indefinite. Reconsideration and withdrawal of the § 112, second paragraph, rejections in this application is respectfully requested.

#### **IV. REJECTIONS UNDER 35 U.S.C. § 103**

On page 7 of the Office Action, claims 1, 4, 25, 26, 28, 46, 51, 54, and 71-76 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent No. 4,099,422 to Cicognani et al. ("Cicognani") in view of U.S. Patent No. 2002/0098935 to Danhauer et al. ("Danhauer").

Claims 3, 27, 53, and 78 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and further in view of JP 02-248741 to Onoe et al. ("Onoe").

Claims 5-7, 29-31, 55-57, and 80-82 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and further in view of U.S. Patent No. 4,498,891 to Mashimo et al. ("Mashimo").

Claims 11, 12, 35, 36, 58, 59, 86, and 87 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer in further view of U.S. Patent No. 6,945,891 to Knutson ("Knutson").

Claims 13, 14, 37, 38, 60, 61, 88, and 89 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and Knutson, and further in view of U.S. Patent No. 7,396,884 to Acten ("Acten").

Claims 15-18, 22, 39-42, 50, 62-65, and 90-93 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer in further view of U.S. Patent No. 7,056,249 to Osaka et al. ("Osaka").

Claim 43 is rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and further in view of Mashimo.

Claims 19-21, 44, 45, 66-69, and 94-97 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and Osaka and further in view of Mashimo.

Claims 23, 98, and 99 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer, Osaka and Mashimo, further in view of Knutson.

Claim 47 is rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and further in view of Knutson.

Claims 24, 48, and 70 are rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and further in view of U.S. Patent No. 5,306,213 to Nakajima et al. ("Nakajima").

Claim 49 is rejected under § 103(a) as allegedly being unpatentable over Cicognani in view of Danhauer and Nakajima, and further in view of U.S. Patent Application Publication No. 2004/0127316 to Hashimoto et al. ("Hashimoto").

Applicants respectfully traverse and request reconsideration and withdrawal of the rejections for at least the following reasons.

Independent claim 1 recites, *inter alia*:

**Toothed belt** for use with oil, the belt comprising:  
a body...and  
a plurality of resistant inserts;  
wherein said **resistant inserts comprise twisted yarns produced from at least a first and a second material wherein the first material comprises glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material, covering the second material entirely;**  
**wherein said resistant inserts have a modulus value of greater than 28 N/mm; and**  
wherein said toothed belt is adapted to operate in substantially continuous contact with oil or partially immersed in oil.

Independent claim 25 recites, *inter alia*:

Timing control...comprising...**a toothed belt adapted for use in substantially continuous contact with oil or partly immersed in oil, and means for maintaining said toothed belt in oil-wet condition; said toothed belt comprising a body...and a plurality of resistant inserts, wherein said resistant inserts comprise twisted yarns produced from at least a first**

**and a second material, wherein the first material comprises glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material, covering the second material entirely; and wherein said resistant inserts have a modulus of greater than 28 N/mm.**

Independent claim 51 recites, *inter alia*:

**A toothed belt adapted for use in substantially continuous contact with oil or partly immersed in oil, the belt comprising a body...and a plurality of resistant inserts; wherein said resistant inserts are produced from at least a first and a second material wherein the first material comprises glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material, covering the second material entirely; wherein said resistant inserts have a modulus of greater than 28 N/mm.**

Independent claim 72 recites, *inter alia*:

A method of providing a belt for use with oil, the method comprising:  
...providing **a toothed belt to operate in said oil-wet environment**, said belt comprising:  
a body...and  
a plurality of resistant inserts;  
wherein said **resistant inserts comprise twisted yarns produced from at least a first and a second material, wherein the first material comprises glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material, covering the second material entirely; wherein said resistant inserts have a modulus of greater than 28 N/mm.**

Emphasis added. Applicants respectfully urge that Cicognani and Danhauer, alone or in combination, fail to disclose or render predictable the above recited features, and that none of the above-cited art of record cures these deficiencies.

Each of the independent claims, as presently amended, recites a toothed belt adapted for use in substantially continuous contact with oil or partly immersed in oil, or variations thereof, and include a plurality of **inserts compris[ing] twisted yarns produced from at least a first and a second material, wherein the first material comprises glass fibers and the second**

**material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material, covering the second material entirely; and wherein said resistant inserts have a modulus of greater than 28 N/mm**

Resistant inserts of this construction are not disclosed nor rendered predictable by prior references. As evidenced by the present specification, belts produced with such inserts displayed an unexpected result of significantly longer life, when used in oil, than belts of the same construction using only glass fibers under the same test conditions. Test results as illustrated in at least Fig. 6 of the specification as originally filed show the superior performance of the inventive belt using inserts of carbon fibers wrapped in glass over belts using similarly constructed inserts comprising only one material, that is, an insert comprising a glass fiber core wrapped with additional glass fibers.

As recited in the original specification, for example at page 3, the object of the present invention is to replace chains and gears in use in contact with oil or partially immersed in oil with a toothed belt. Toothed belts of narrower width than those used in systems not in contact with oil are desirable to allow direct replacement of the present chains or gears.

The typical solution attempted in the art to make such belts was to provide belts with an insert made from a material having very high modulus. For example, carbon fibers could be used as the material is known to have a high modulus. However, belts made from such high modulus materials are known to have problems with adhesion between the insert and the belt material.

Applicants discovered the claimed belt, including a resistant insert, or cord, comprised of two different materials, overcame the deficiencies of adhesion found in prior belts. The insert could provide the increased modulus necessary for a narrow belt to replace a chain or gear

system while maintaining the mechanical properties necessary to directly replace the gears or chains. Adhesion between high modulus inserts and belt composition had been a problem in prior narrow belts intended to replace chains and gears.

Applicants discovered an insert with an appropriate modulus that overcame the adhesion problem with the belt material found in prior belts. Overcoming the adhesion problem found in prior belts allowed toothed belts to replace gear and chain systems in contact with oil.

Exhibit A, pages 1-6, illustrates the improved adhesion between the inventive inserts of carbon fiber wrapped in glass fiber and the previously known carbon fiber inserts.

The aim of the test is to evaluate the different adhesion to the surrounding rubber body of the belt achieved using two different cord constructions. The first belt is made from a single yarn of carbon fiber (the same carbon fiber used as a core of the inventive insert). The second insert is formed from the same carbon fiber core as the first insert with the addition of surrounding the core with glass fiber yarns as presently claimed. The rubber compound for the belts in both tests is the same, designated as LAETITIA. The force required to separate the insert from the surrounding rubber body is measured according to ISO 12046 as illustrated and is indicative of the adhesion present between the insert and the rubber body.

As illustrated on page 4 of Exhibit A, the carbon inserts separated from the rubber body at a mean force of 1088 Newtons. In contrast, the insert comprised of a carbon core surrounded by glass fiber separated from the rubber body at a mean force of 1714 Newtons as shown on page 6 of the Exhibit.

Applicants submit that no other prior belts addressed this problem and none of the references cited disclose or render predictable such improved adhesion results. Applicants

further submit that the surprising technical effect shown in the test results is not predicted in any of the cited references.

Regarding the § 103 rejections, the Office Action rejects independent claims 1, 25, 51, and 72 as unpatentable over Cicognani in view of Danhauer. Page 4 of the Office Action concedes that Cicognani fails to disclose resistant inserts comprising fibers made from first and second materials, the first material being glass fibers and the second material being carbon fibers, and the first material at least partially covering the second material.

Instead, the Office Action relies upon Danhauer for teaching inserts produced from a first and second material, and asserts that Danhauer discloses two materials helically wound together such that the first material would at least partially cover the second material.

Applicants respectfully submit that Danhauer fails to make such a teaching. Paragraph [0019] of Danhauer, as cited in the Office Action, recites, “The reinforcing cords 22 are preferably helically wound cords having individual turns arranged insubstantially equally spaced relation across the belt body.” The last paragraph of page 4 of the Office Action, in addressing arguments presented in the August 16, 2010 response, asserts the reference discloses a plurality of fibers in parallel orientation, one end held stationary and the second end provided with an angular rotation to create a helical twist.

Applicants submit that Danhauer fails to teach the suggested cord construction. As illustrated in the figures of Danhauer, the inserts are singular fibers with no helical twist as asserted. Furthermore, the cited paragraph ([0019]) specifies that the helical winding is “across the belt body,” not within the inserts themselves.

Accordingly, Applicants respectfully submit that Danhauer fails to disclose **inserts are produced from at least a first and a second material wherein the first material comprises**



**glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material** as required by the claims.

As amended, the independent claims recite **the first material comprises glass fibers and the second material comprises carbon fibers, and twisted yarns of the first material are wound around a twisted yarn of the second material**. This limitation was included in original claim 3. On page 13 of the Office Action, in paragraph 13, claim 3 is rejected over Cicognani in view of Danhauer and Onoe. Onoe is asserted to disclose reinforcing cords made with a core section made out of a no-twist fiber bundle and a shell section disposed in the periphery of the core and having a twist.

However, as indicated above, the presently claimed inserts include **twisted yarns of the first material are wound around a twisted yarn of the second [i.e., core] material**. Therefore, because Onoe specifies a no-twist core, the reference cannot also teach a core of a **twisted yarn of the second material** as claimed.

Furthermore, Applicants submit combining Cicognani with Onoe, “for the purpose of increasing durability and reducing stress concentrations” as asserted on page 14 of the Office Action is unrelated to the problem solved by claimed insert, that is, improved adhesion. One of skill in the art, seeking to solve an adhesion problem, would not look to Onoe for a solution.

For at least the foregoing reasons, it is believed that revised independent claim 1 patentably distinguishes over the relied upon portions of Cicognani, Danhauer, and Onoe, either alone or in combination, and is therefore allowable. Claims 25, 51, and 72 are similar, or somewhat similar, in scope to claim 1, and are therefore allowable for similar, or somewhat similar, reasons. Further, claims 4-7, 11-24, which depend from claim 1, claims 27-31, 35-50,

which depend from claim 25, claims 54-71, which depend from claim 51, and claims 73-76, 79-82, 86-98, which depend from claim 72, are allowable as well.

Statements appearing above with respect to the disclosures in the cited references represent the present opinions of the Applicants' undersigned attorney and, in the event that the Examiner disagrees with any such opinions, it is respectfully requested that the Examiner specifically indicate those portions of the respective reference providing the basis for a contrary view.

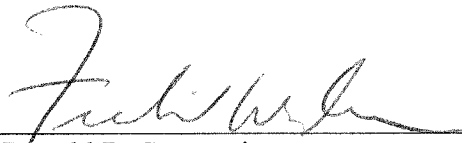
**CONCLUSION**

In view of the foregoing, it is believed that the present application is in condition for allowance. Accordingly, Applicants' attorneys respectfully request that a timely Notice of Allowance be issued in this case.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,

Respectfully submitted,  
FROMMER LAWRENCE & HAUG LLP  
Attorneys for Applicants

By: 

Ronald R. Santucci  
Reg. No. 28,988

Frederick W. Dour  
Reg. No. 39,174

Telephone: (212) 588-0800  
Facsimile: (212) 588-0500